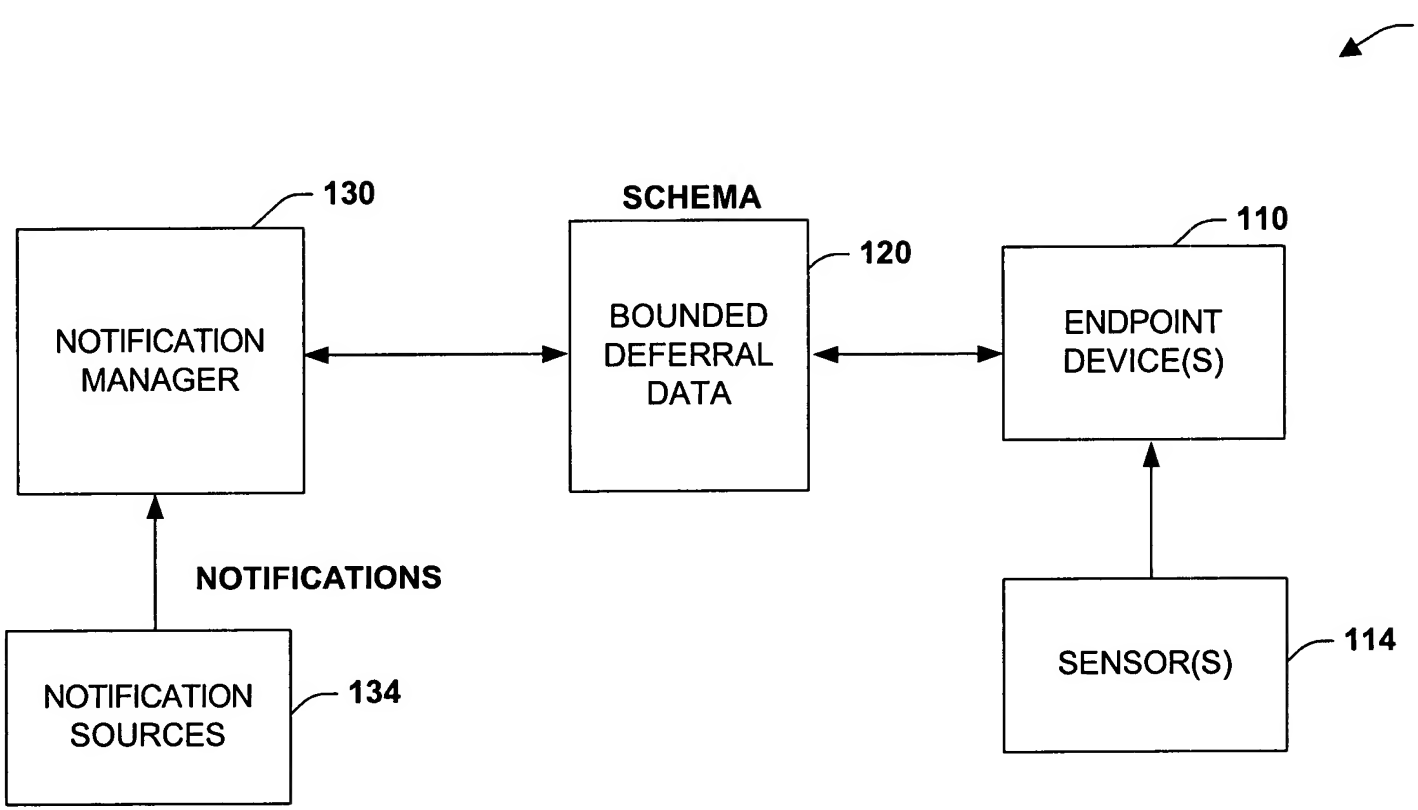
100
130
NOTIFICATION MANAGER
SCHEMA
120
BOUNDED DEFERRAL DATA
110
ENDPOINT DEVICE(S)
NOTIFICATIONS
NOTIFICATION SOURCES
134
SENSOR(S)
114

FIG. 1

BOUNDED-DEFERRAL POLICY

- WAIT FOR A "USER AVAILABLE STATE" UNLESS HIT TIME BOUND, THEN DISRUPT

- LIST OF BUSY / AVAILABLE STATES PER CONTEXT

- URGENCY-SENSITIVE TIME BOUNDS
  T(HIGH) = T1 < T(MED) = T2 < T(LOW) = T3

- BOUNDS CAN DEPEND ON CONTEXT (E.G., WORKLOAD), NUMBER OF MESSAGES RECEVIED, ETC.

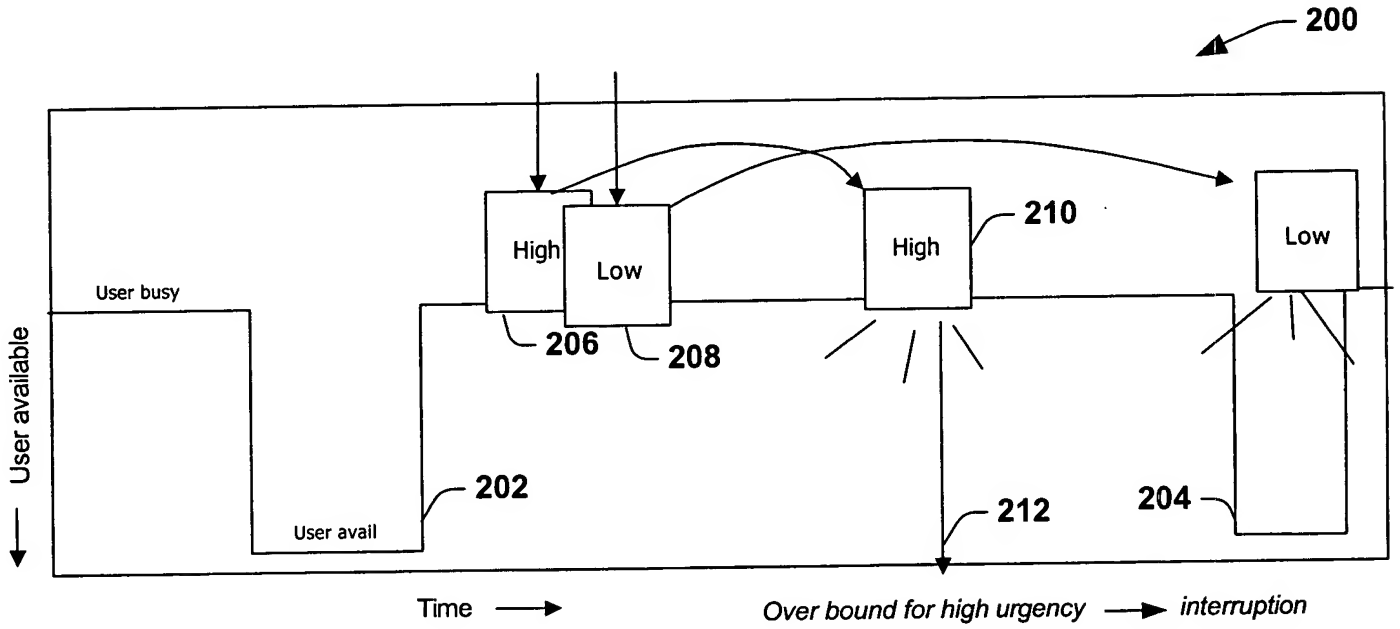

FIG. 2

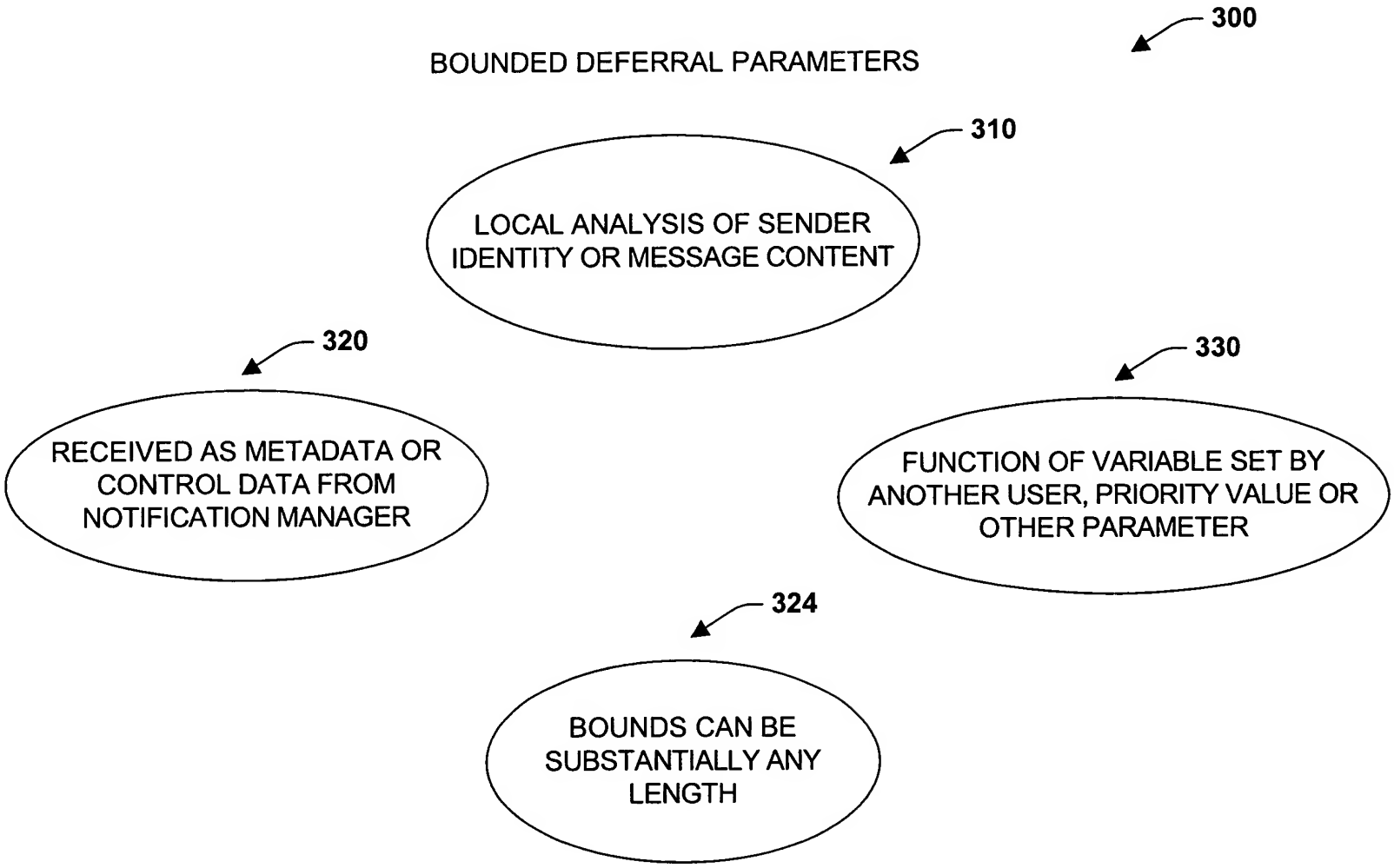
300
BOUNDED DEFERRAL PARAMETERS
310
LOCAL ANALYSIS OF SENDER IDENTITY OR MESSAGE CONTENT
320
RECEIVED AS METADATA OR CONTROL DATA FROM NOTIFICATION MANAGER
330
FUNCTION OF VARIABLE SET BY ANOTHER USER, PRIORITY VALUE OR OTHER PARAMETER
324
BOUNDS CAN BE SUBSTANTIALLY ANY LENGTH

FIG. 3

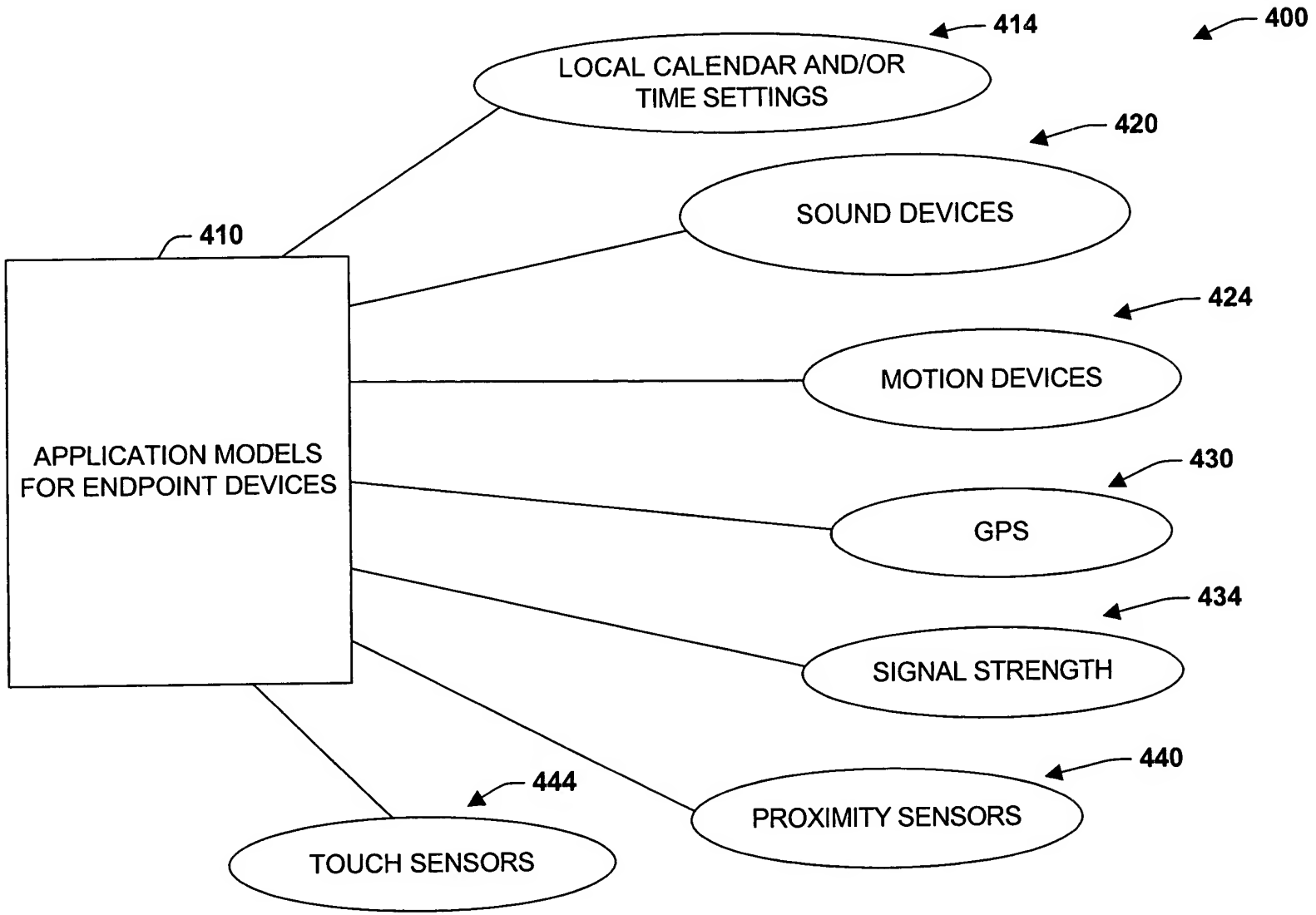
400
414
LOCAL CALENDAR AND/OR TIME SETTINGS
420
SOUND DEVICES
410
APPLICATION MODELS FOR ENDPOINT DEVICES
424
MOTION DEVICES
430
GPS
434
SIGNAL STRENGTH
440
PROXIMITY SENSORS
444
TOUCH SENSORS

FIG. 4

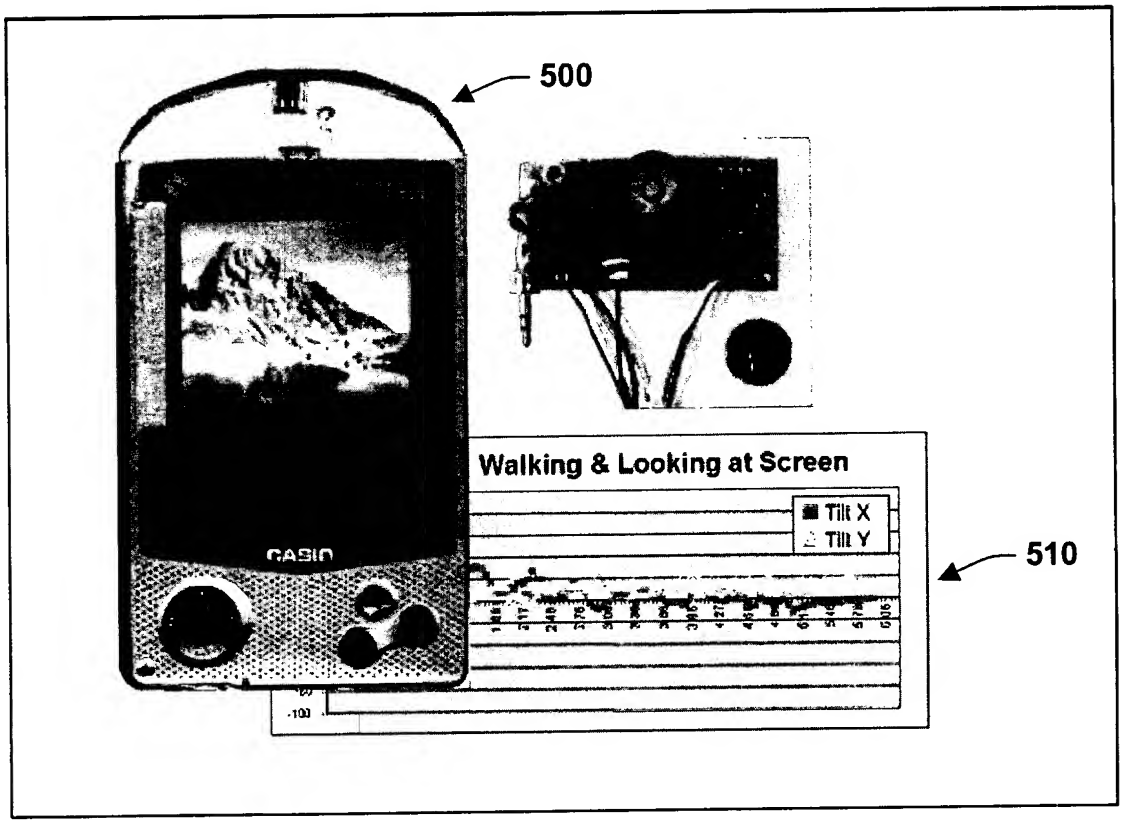

FIG. 5

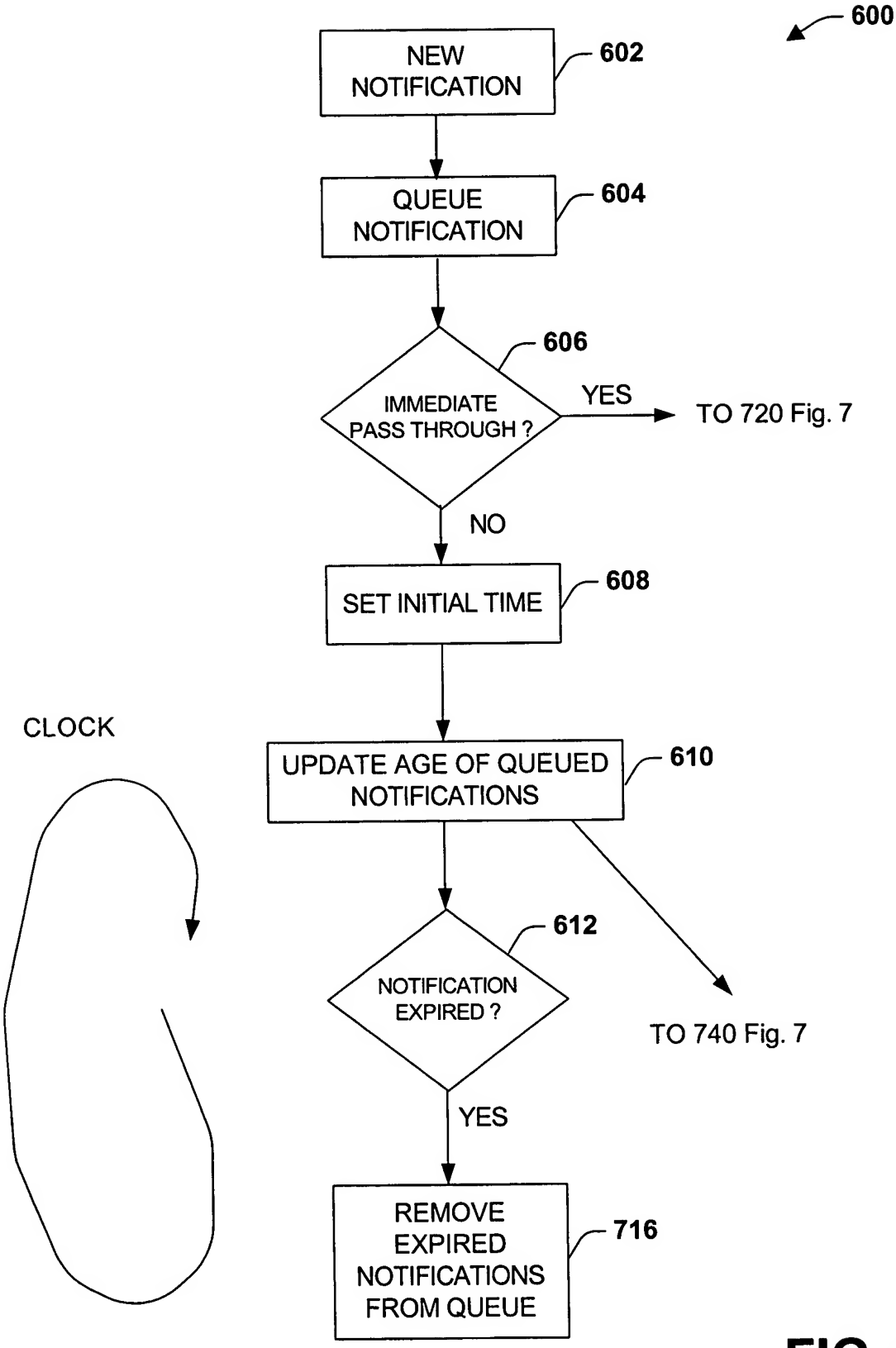
600
NEW NOTIFICATION
602
QUEUE NOTIFICATION
604
606
IMMEDIATE PASS THROUGH ?
YES
TO 720 Fig. 7
NO
SET INITIAL TIME
608
CLOCK
UPDATE AGE OF QUEUED NOTIFICATIONS
610
612
NOTIFICATION EXPIRED ?
TO 740 Fig. 7
YES
REMOVE EXPIRED NOTIFICATIONS FROM QUEUE
716

FIG. 6

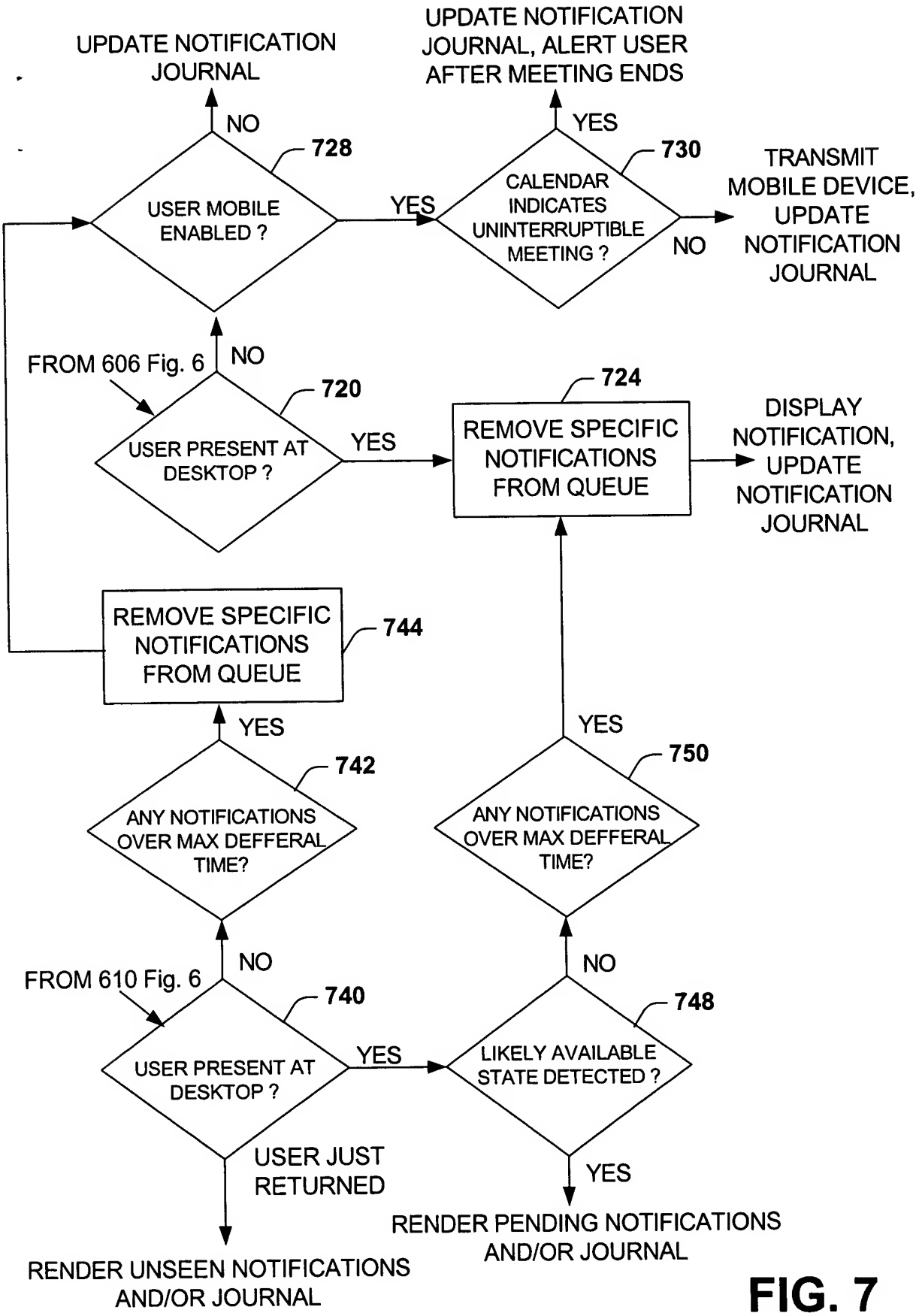
UPDATE NOTIFICATION JOURNAL
NO
728
USER MOBILE ENABLED ?
YES
UPDATE NOTIFICATION JOURNAL, ALERT USER AFTER MEETING ENDS
YES
730
CALENDAR INDICATES UNINTERRUPTIBLE MEETING ?
NO
TRANSMIT MOBILE DEVICE, UPDATE NOTIFICATION JOURNAL
FROM 606 Fig. 6
NO
720
USER PRESENT AT DESKTOP ?
YES
724
REMOVE SPECIFIC NOTIFICATIONS FROM QUEUE
DISPLAY NOTIFICATION, UPDATE NOTIFICATION JOURNAL
REMOVE SPECIFIC NOTIFICATIONS FROM QUEUE
744
YES
742
ANY NOTIFICATIONS OVER MAX DEFFERAL TIME?
YES
750
ANY NOTIFICATIONS OVER MAX DEFFERAL TIME?
FROM 610 Fig. 6
NO
740
USER PRESENT AT DESKTOP ?
YES
NO
748
LIKELY AVAILABLE STATE DETECTED ?
USER JUST RETURNED
YES
RENDER UNSEEN NOTIFICATIONS AND/OR JOURNAL
RENDER PENDING NOTIFICATIONS AND/OR JOURNAL

FIG. 7

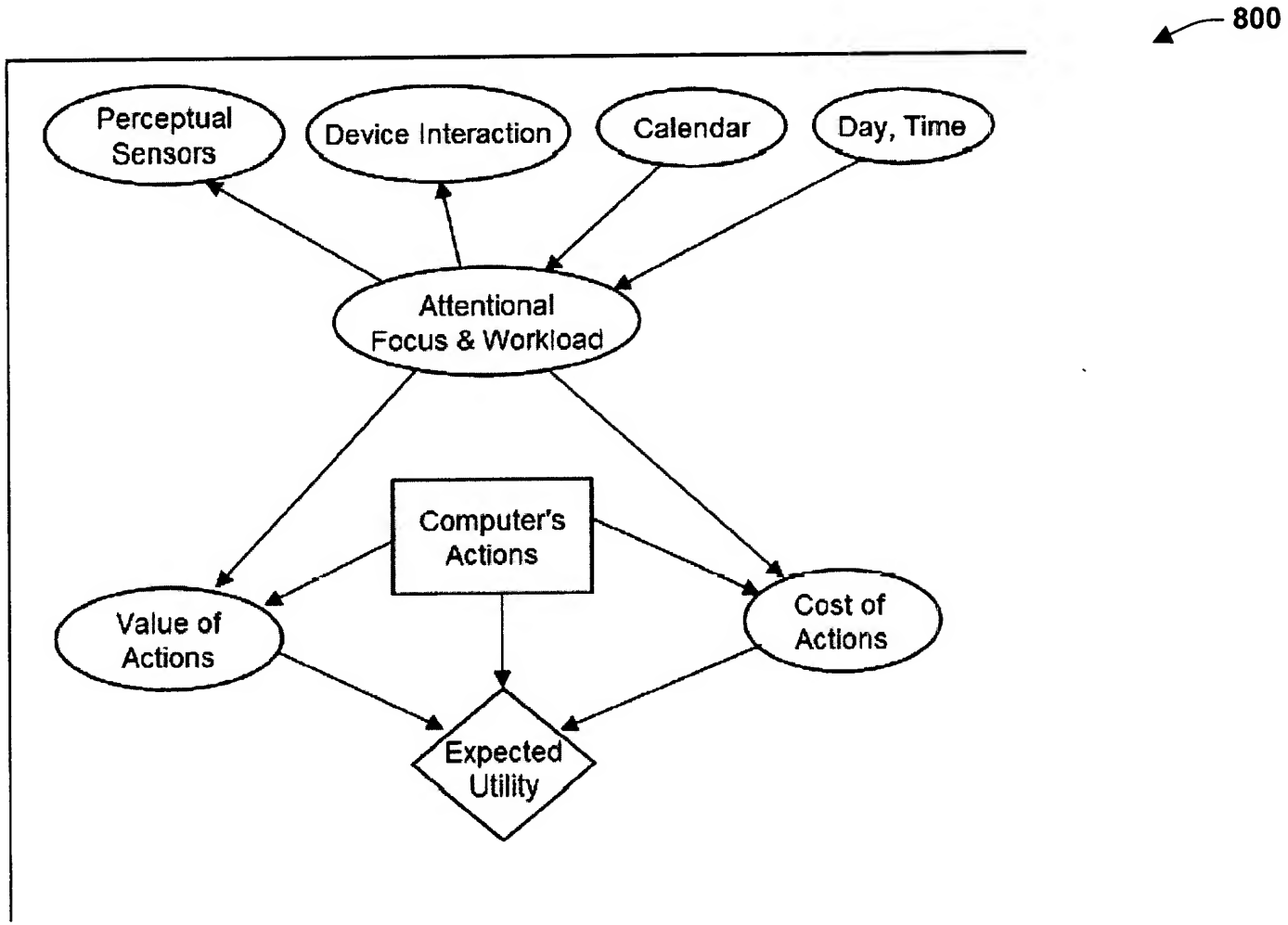
800
Perceptual Sensors
Device Interaction
Calendar
Day, Time
Attentional Focus & Workload
Computer's Actions
Value of Actions
Cost of Actions
Expected Utility

FIG. 8

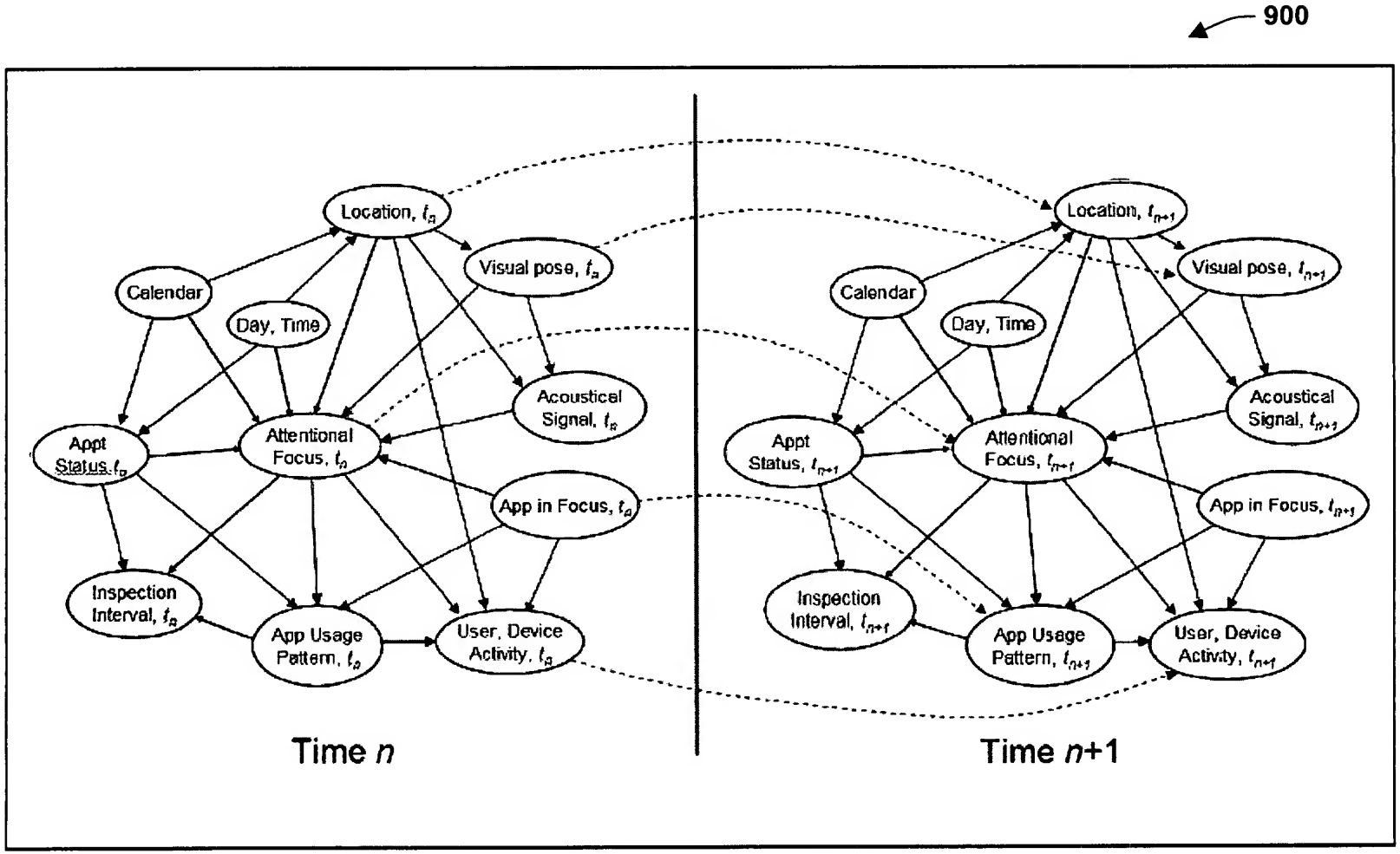
900
Location, t_n
Visual pose, t_n
Calendar
Day, Time
Acoustical Signal, t_n
Appt Status, t_n
Attentional Focus, t_n
App in Focus, t_n
Inspection Interval, t_n
App Usage Pattern, t_n
User, Device Activity, t_n
Time n
Location, t_{n+1}
Visual pose, t_{n+1}
Calendar
Day, Time
Acoustical Signal, t_{n+1}
Appt Status, t_{n+1}
Attentional Focus, t_{n+1}
App in Focus, t_{n+1}
Inspection Interval, t_{n+1}
App Usage Pattern, t_{n+1}
User, Device Activity, t_{n+1}
Time n+1

FIG. 9

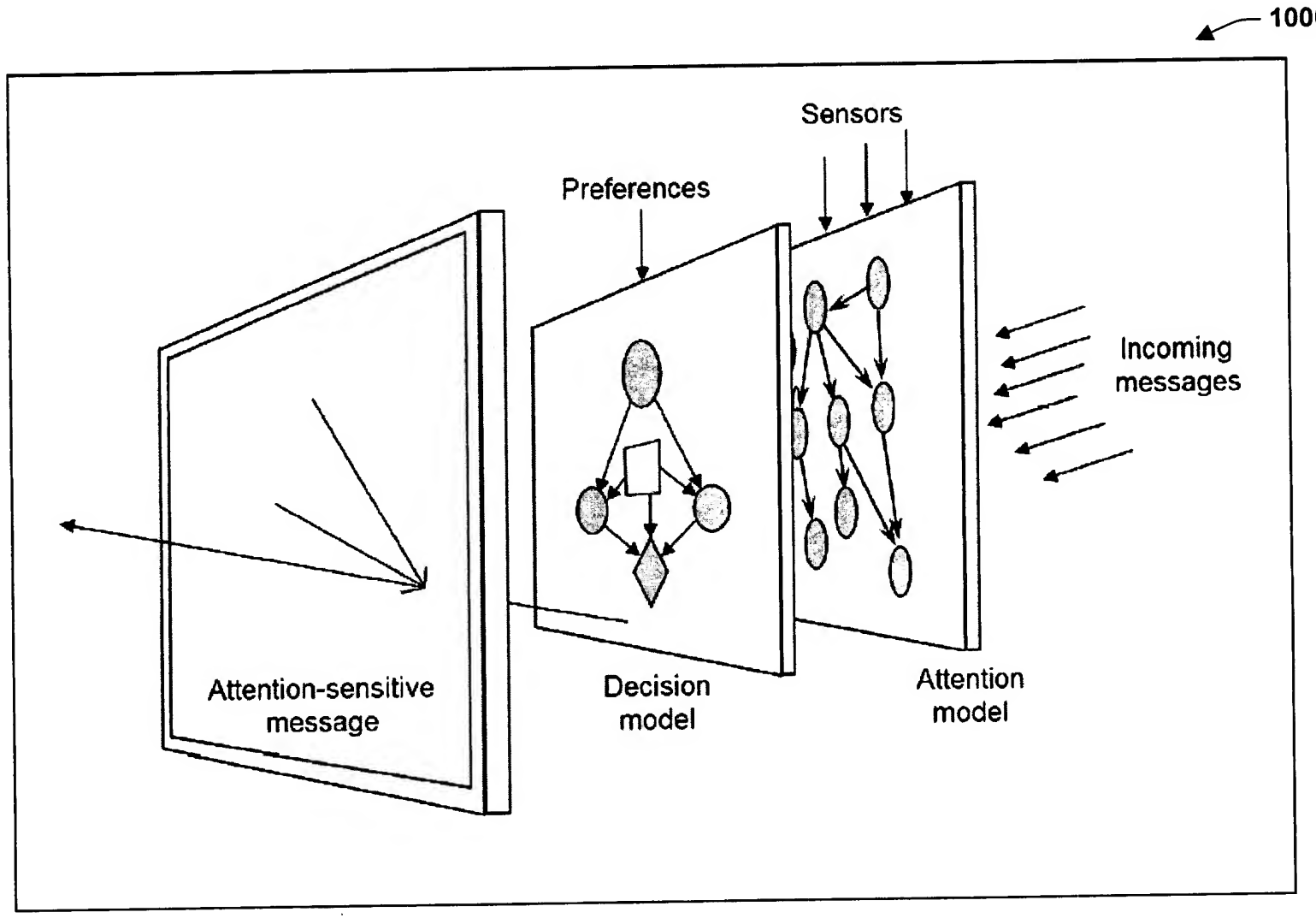
1000
Sensors
Preferences
Incoming
messages
Attention-sensitive
message
Decision
model
Attention
model

FIG. 10

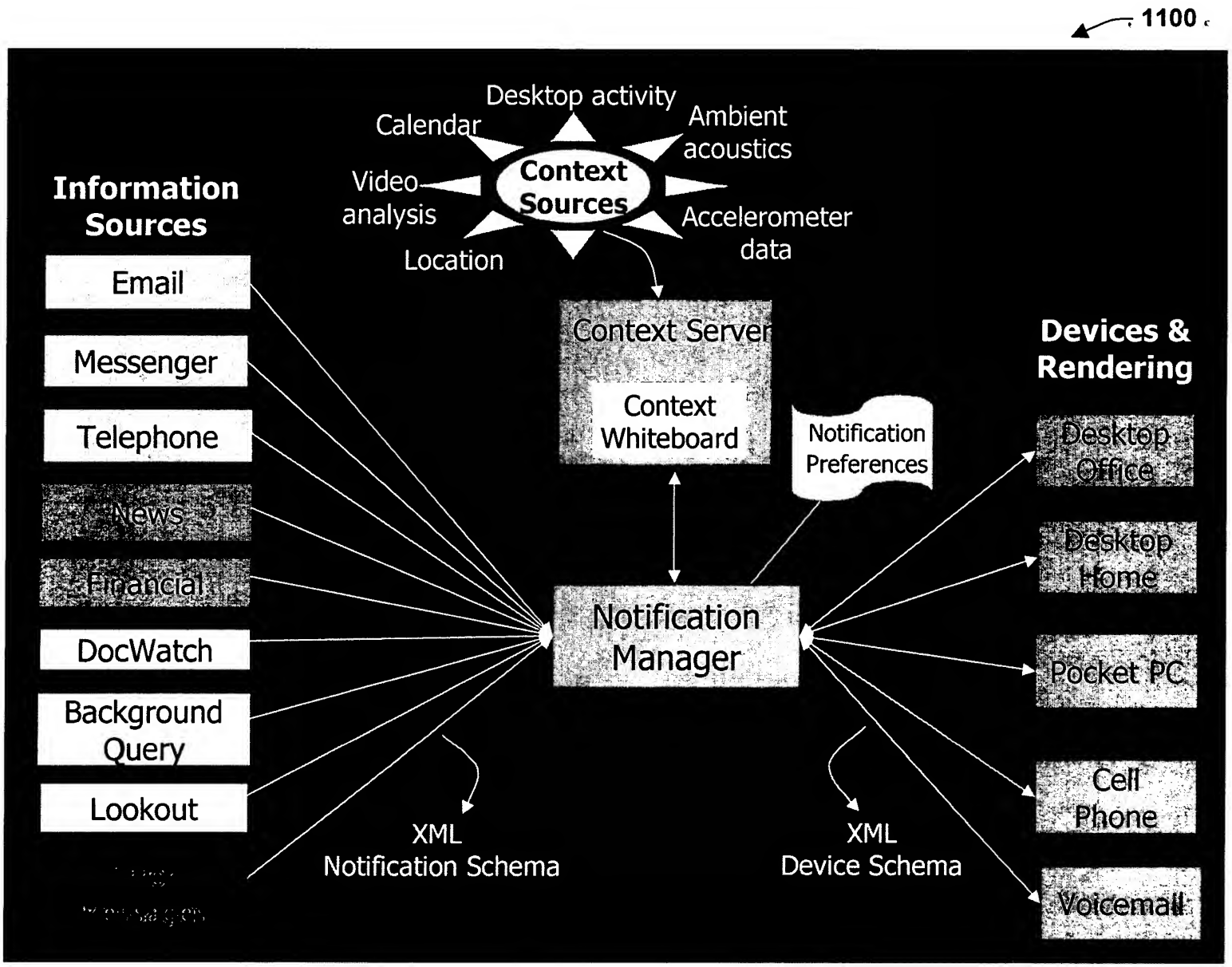
1100
Desktop activity
Calendar
Ambient acoustics
Video analysis
Context Sources
Accelerometer data
Location
Information Sources
Email
Messenger
Telephone
News
Financial
DocWatch
Background Query
Lookout
Context Server
Context Whiteboard
Notification Preferences
Notification Manager
XML Notification Schema
XML Device Schema
Devices & Rendering
Desktop Office
Desktop Home
Pocket PC
Cell Phone
Voicemail

FIG. 11

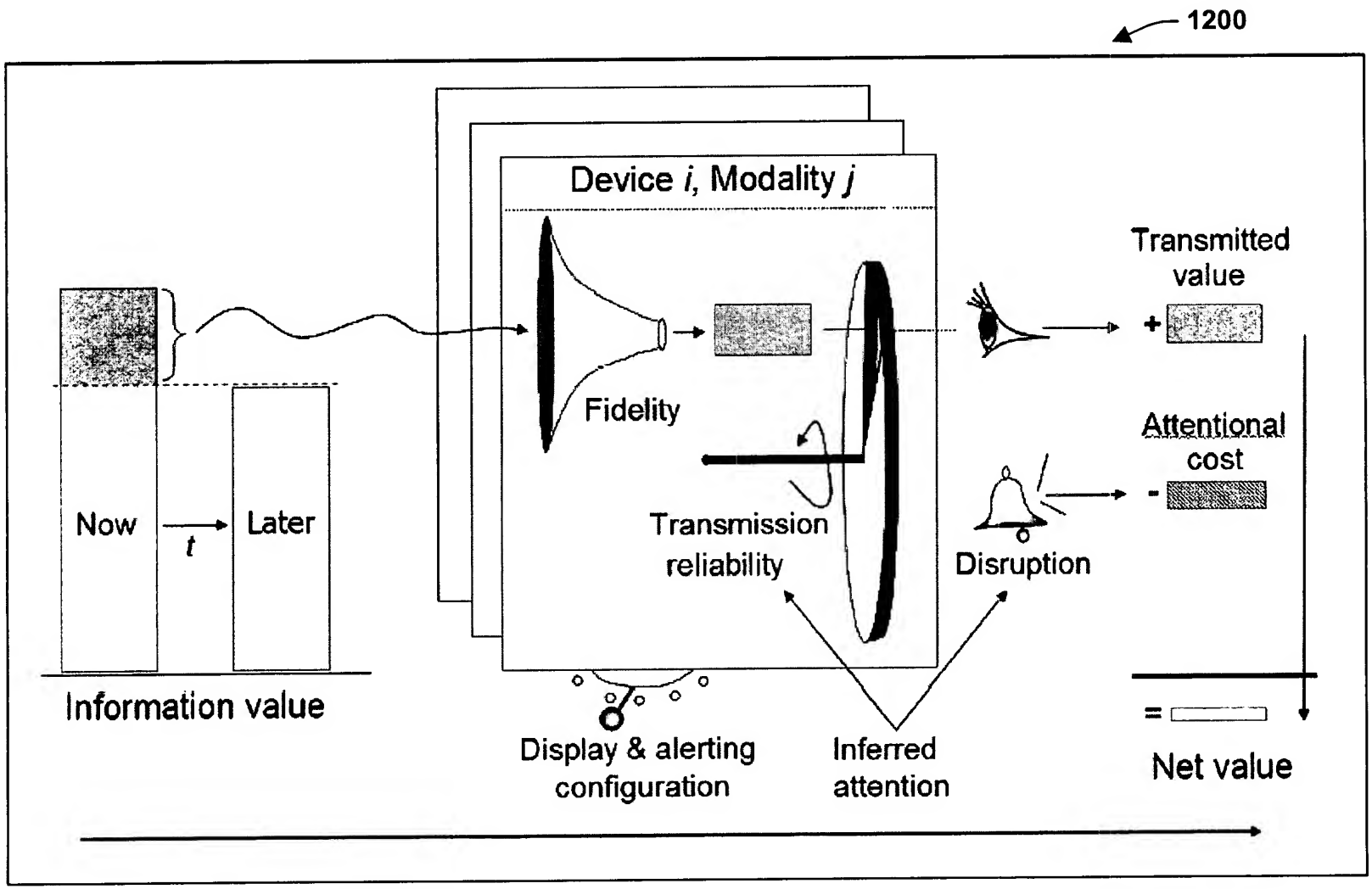
1200
Device i, Modality j
Transmitted value
+
Fidelity
Attentional cost
-
Transmission reliability
Disruption
Now
t
Later
Information value
=
Net value
Display & alerting configuration
Inferred attention

FIG. 12

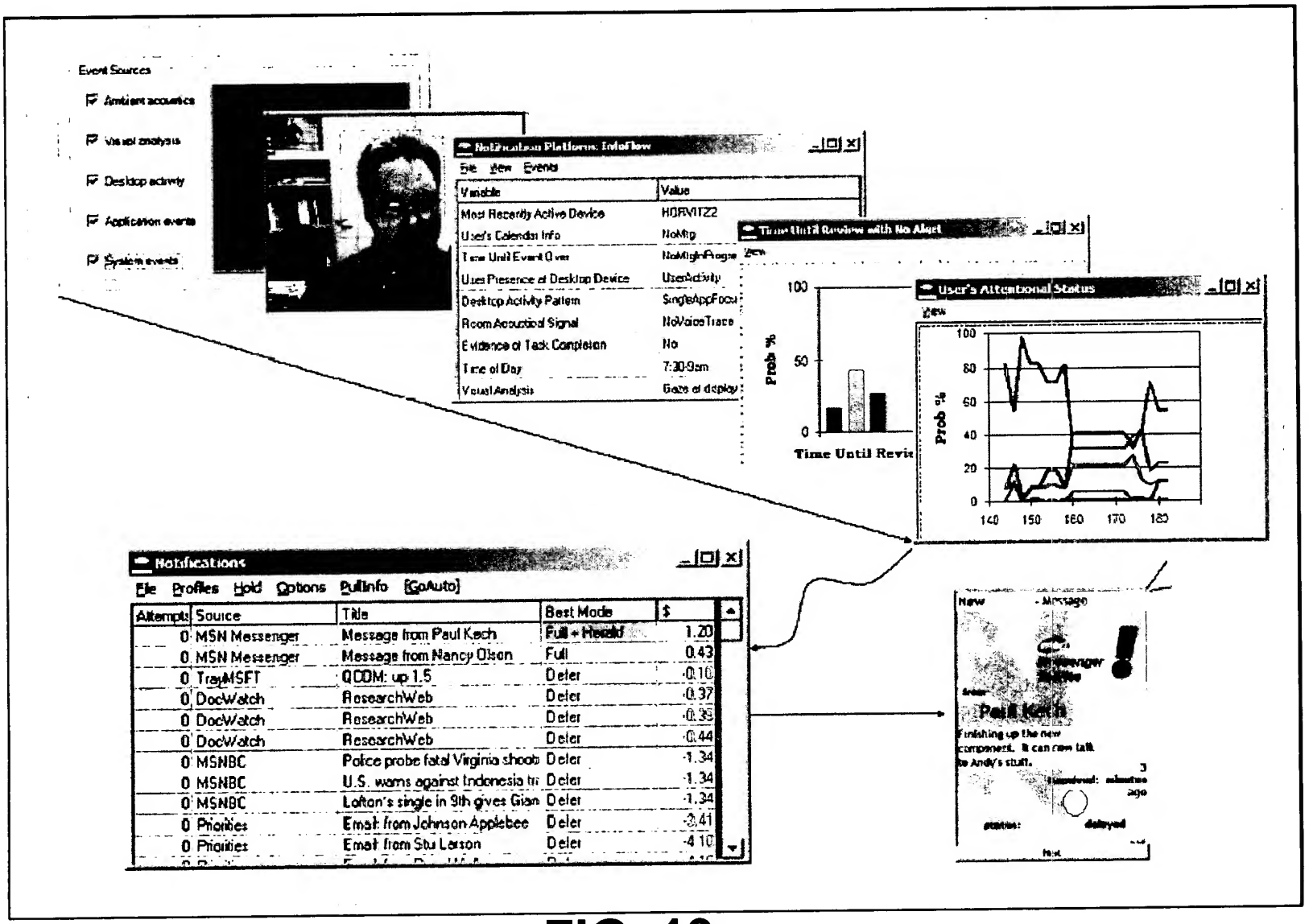
1300
Event Sources
Ambient acoustics
Visual analysis
Desktop activity
Application events
System events
Variable
Value
Most Recently Active Device
HORVITZ2
User's Calendar Info
NoMtg
Time Until Event Over
NoMtgsForNow
User Presence at Desktop Device
UserActivity
Desktop Activity Pattern
SingleAppFocu
Room Acoustical Signal
NoVoiceTrace
Evidence of Task Completion
No
Time of Day
7:30-9am
Visual Analysis
State of display
Time Until Review with No Alert
Prob %
Time Until Revie
User's Attentional Status
Prob %
Notifications
File Profiles Hold Options PullInfo [GoAuto]
Attempts
Source
Title
Best Mode
$
0 MSN Messenger Message from Paul Koch Full + Headl 1.20
0 MSN Messenger Message from Nancy Olson Full 0.43
0 TrayMSFT QCDM: up 1.5 Defer -0.10
0 DocWatch ResearchWeb Defer -0.37
0 DocWatch ResearchWeb Defer -0.39
0 DocWatch ResearchWeb Defer -0.44
0 MSNBC Police probe fatal Virginia shoot Defer -1.34
0 MSNBC U.S. warns against Indonesia tr Defer -1.34
0 MSNBC Lofton's single in 9th gives Gian Defer -1.34
0 Priorities Email from Johnson Applebee Defer -2.41
0 Priorities Email from Stu Larson Defer -4.10
New - Message
Paul Koch
Finishing up the new component. It can now talk to Andy's stuff.

FIG. 13

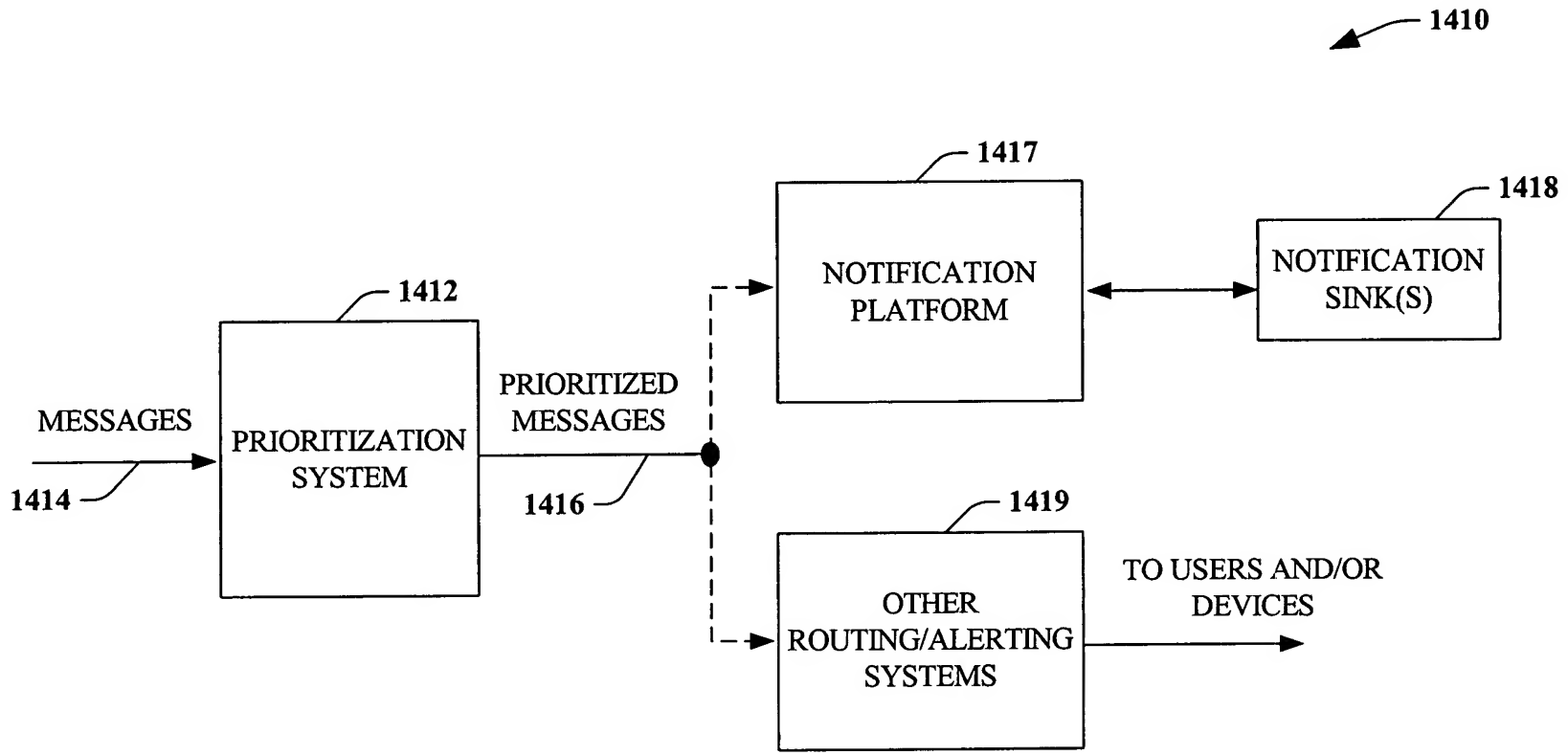
1410
1417
1418
NOTIFICATION PLATFORM
NOTIFICATION SINK(S)
1412
MESSAGES
PRIORITIZATION SYSTEM
PRIORITIZED MESSAGES
1414
1416
1419
OTHER ROUTING/ALERTING SYSTEMS
TO USERS AND/OR DEVICES

FIG. 14

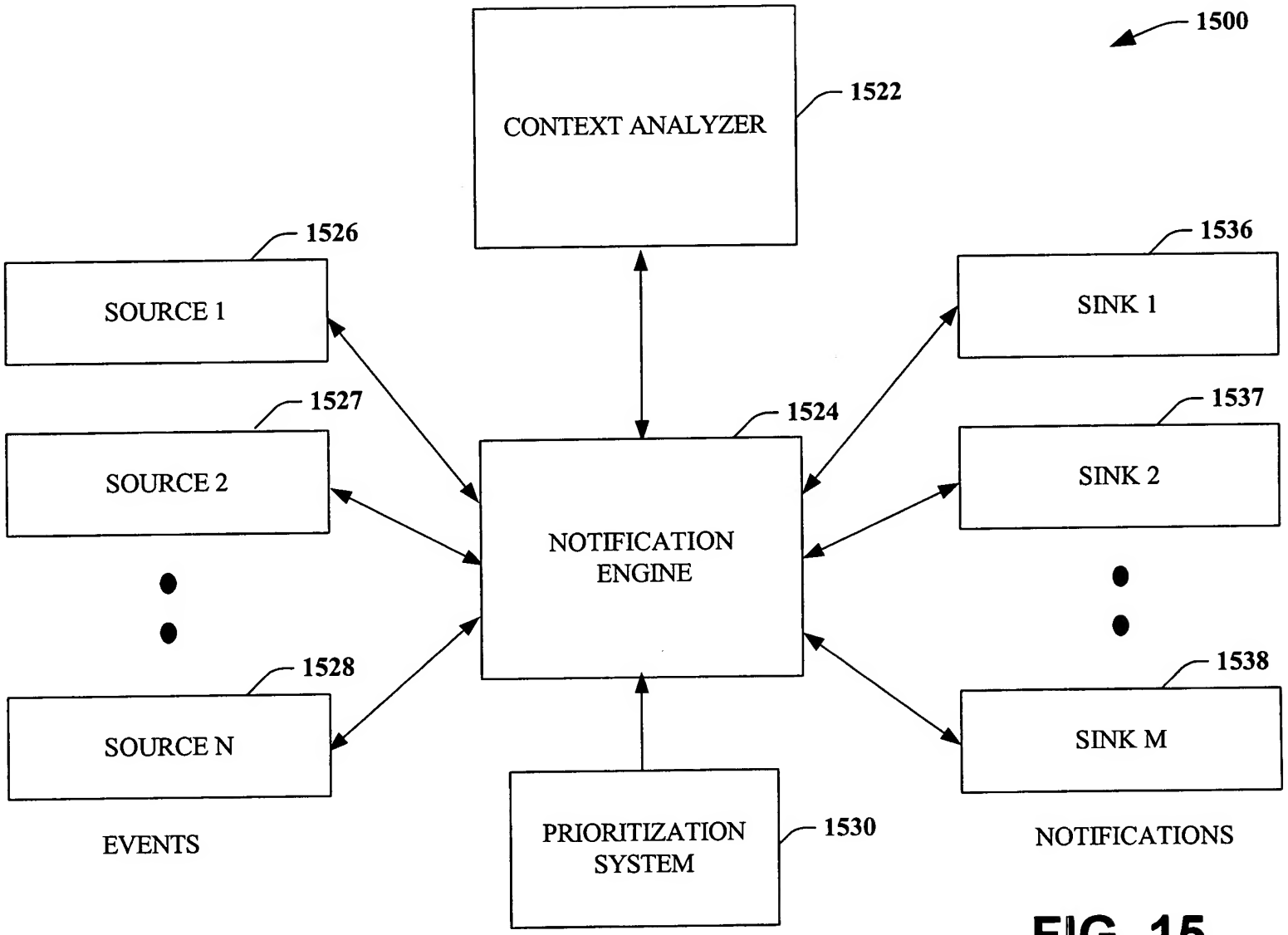
1500
CONTEXT ANALYZER
1522
1526
SOURCE 1
1527
SOURCE 2
1528
SOURCE N
EVENTS
NOTIFICATION ENGINE
1524
PRIORITIZATION SYSTEM
1530
1536
SINK 1
1537
SINK 2
1538
SINK M
NOTIFICATIONS

FIG. 15

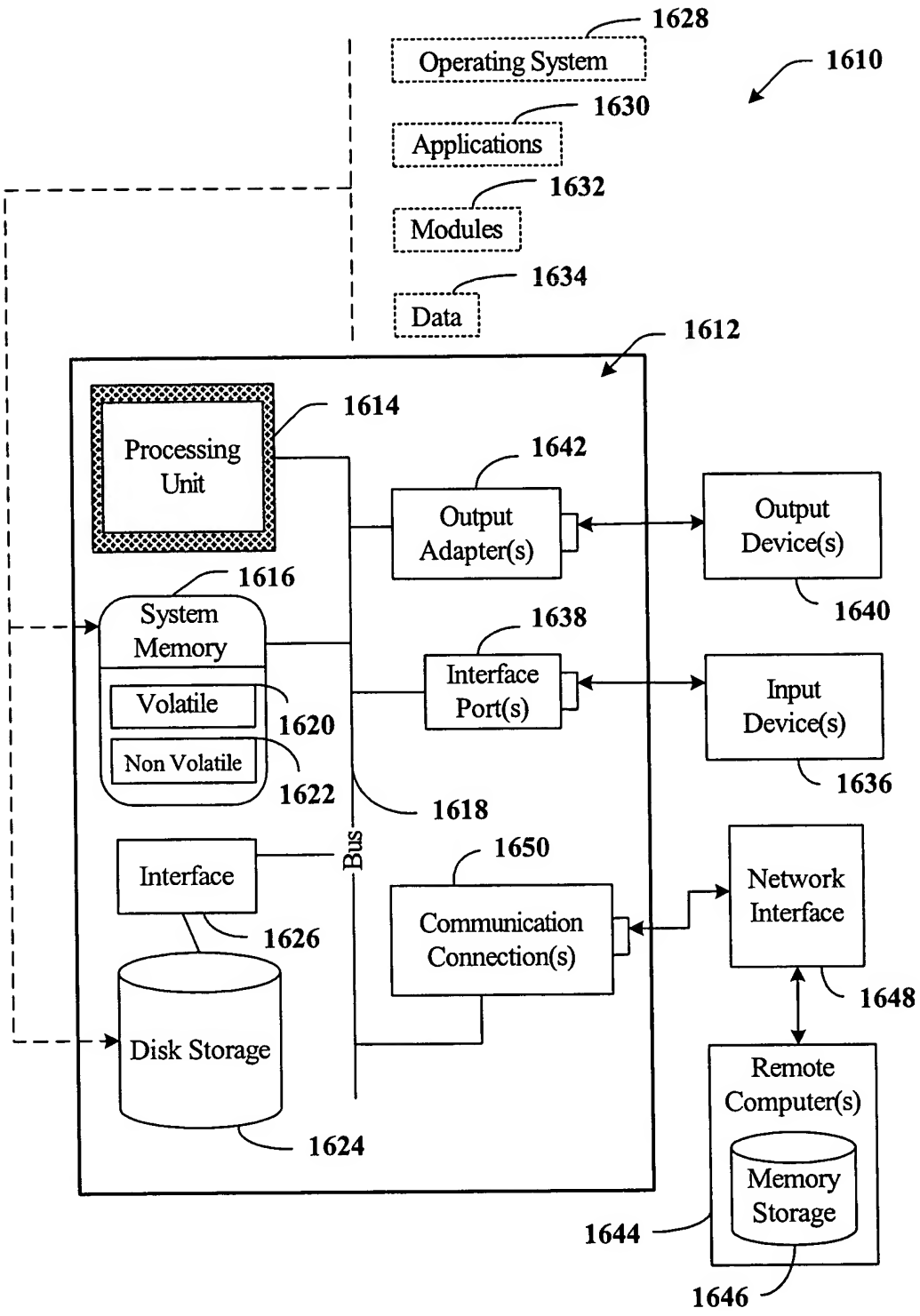
1628
Operating System
1610
1630
Applications
1632
Modules
1634
Data
1612
1614
Processing Unit
1642
Output Adapter(s)
Output Device(s)
1640
1616
System Memory
1638
Interface Port(s)
Input Device(s)
1636
Volatile
1620
Non Volatile
1622
1618
Bus
Interface
1650
Communication Connection(s)
Network Interface
1648
1626
Disk Storage
Remote Computer(s)
Memory Storage
1644
1646
1624

FIG. 16

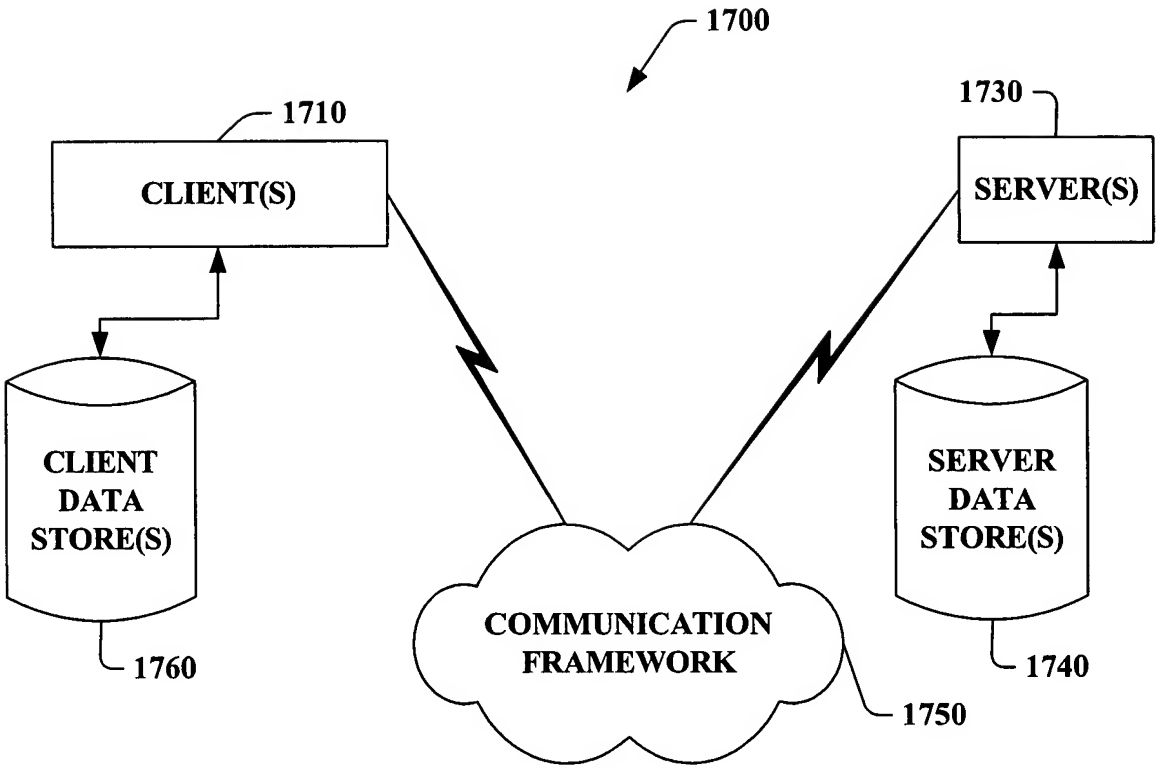
1700
1710
CLIENT(S)
1730
SERVER(S)
CLIENT DATA STORE(S)
1760
COMMUNICATION FRAMEWORK
1750
SERVER DATA STORE(S)
1740

FIG. 17